## State of California Department of Fish and Wildlife

## Memorandum

**Date:** 5/28/2019

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Bay Delta Region

Subject: 2019 Delta Smelt Relative Abundance Index from the Spring Kodiak Trawl

## 2019 Results

The 2019 Spring Kodiak Trawl (SKT) Delta Smelt index of relative abundance was 0.4 and the lowest index on record (Figure 1). The Spring Kodiak Trawl index is calculated using 39 stations, each sampled monthly January through April (156 sampling events). Only two Delta Smelt were caught during these sampling events: one was collected in the Sacramento River in January, and one was collected in Suisun Bay in February (Figure 2). This low index and associated catch was consistent with record low Delta Smelt relative abundance in proceeding 2018 surveys<sup>1</sup>, and the 2019 Enhanced Delta Smelt Monitoring (EDSM)<sup>2</sup>. The EDSM caught 24 Delta Smelt from January through March (about 1,820 sampling events), mostly in the Sacramento River, the Sacramento Deep Water Ship Channel, and Suisun Bay.

Since the SKT monitors the adult Delta Smelt spawning stock, this year's index indicates that the number of spawners was at a record low, which may limit larval recruitment and hinder the recovery of Delta Smelt in 2019.

<sup>&</sup>lt;sup>1</sup> See Memorandum: 2018 20-mm Survey Delta Smelt Index of Relative Abundance Supplemental Documentation, available here: <a href="https://www.wildlife.ca.gov/Conservation/Delta/20mm-Survey/Bibliography">https://www.wildlife.ca.gov/Conservation/Delta/20mm-Survey/Bibliography</a> and Memorandum: Fall Midwater Trawl 2018 Annual Fish Abundance Summary, available here: <a href="https://www.wildlife.ca.gov/Conservation/Delta/Fall-Midwater-Trawl/Bibliography">https://www.wildlife.ca.gov/Conservation/Delta/Fall-Midwater-Trawl/Bibliography</a>

<sup>&</sup>lt;sup>2</sup> See Delta Juvenile Fish Monitoring Program Enhanced Delta Smelt Monitoring, Monitoring Data <a href="https://www.fws.gov/lodi/juvenile\_fish\_monitoring\_program/jfmp\_index.htm">https://www.fws.gov/lodi/juvenile\_fish\_monitoring\_program/jfmp\_index.htm</a>

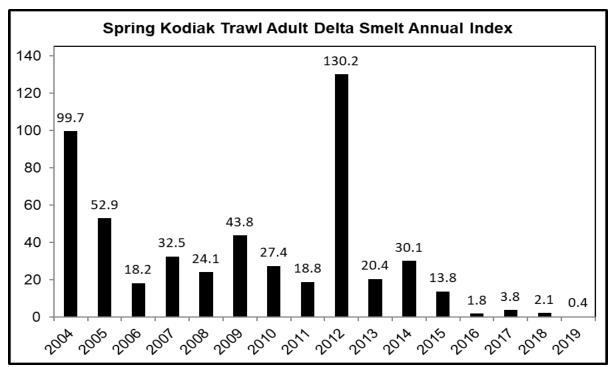


Figure 1. The CDFW's Spring Kodiak Trawl Delta Smelt index, 2004-2019.

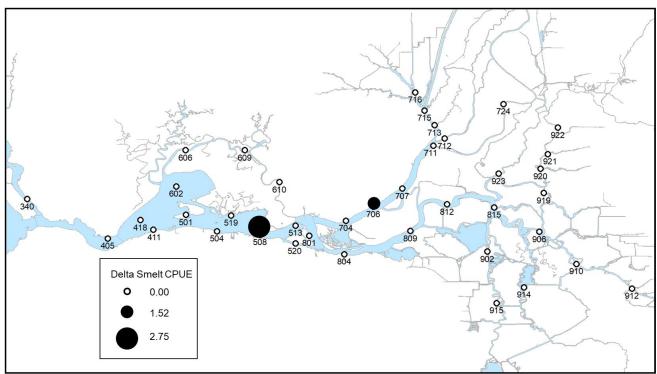


Figure 2. Map of the upper San Francisco Estuary showing the 2019 CDFW Spring Kodiak Trawl index stations and associated adult Delta Smelt catch per unit effort (10,000 m3) for all index surveys.

## Index Methods

SKT operates annually to track the distribution, relative abundance, and spawning condition of adult Delta Smelt throughout its historic range in the upper San Francisco Estuary. The SKT is conducted monthly from January to May and was initiated in 2002. The methods were standardized in 2004 and a Delta Smelt index was first developed in 2012.

The SKT Delta Smelt index is calculated using only index surveys and index stations (Figure 2). Logistical issues sometimes prevent stations from being sampled (Table 1). In 2019, 1 index station was not sampled during Survey 2 because high flows made sampling unsafe. To calculate the index, stations are grouped into 3 spatial regions and a mean catch per 10,000 cubic meters of water (i.e., CPUE) is calculated. The regional means are then summed to create an index for each survey, and survey indices are summed to calculate the SKT index. The SKT index allows for comparison across years to reflect trends in the population, but it is not an abundance estimate of the overall population.

Table 1. Index stations not sampled during CDFW's Spring Kodiak Trawl by survey, 2004 to 2019.

Survey	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	724	724				922				724		711 724		724 922 923		
	724 919 920 921 922 923			340	340							923	724			724
3	724								724 610 609 606 602 519 504 501 418 411 405 340		724			724		
4	724	724														